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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/685,704	10/16/2003	Tadashi Nakatani	025720-00015	8389

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EXAMINER

SUMMONS, BARBARA

ART UNIT	PAPER NUMBER
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2817

DATE MAILED: 12/21/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

10/685,704

Applicant(s)

NAKATANI ET AL.

Examiner

Barbara Summons

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☐ Responsive to communication(s) filed on ____.
- 2a) ☐ This action is FINAL. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-18 is/are pending in the application.
4a) Of the above claim(s) ____ is/are withdrawn from consideration.
- 5) ☒ Claim(s) 3 and 9-13 is/are allowed.
- 6) ☒ Claim(s) 1, 2, 4, 5, 7, 8, 15, 17 and 18 is/are rejected.
- 7) ☒ Claim(s) 6, 14 and 16 is/are objected to.
- 8) ☐ Claim(s) ____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 16 October 2003 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
a) ☒ All b) ☐ Some * c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. ____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date 10/16/03
- 4) ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date. ____.
- 5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: ____.

DETAILED ACTION

Claim Objections

1. Claims 1-3 and 8-13 are objected to because of the following informalities:

Each of claims 1-3 and 8-13 needs to include that the units for Cop and Cos must be -- pF -- and the units for the center frequency must be -- GHz -- since this must be the case in order for the equation to work out (see Applicants' example using Cop and Cos in pF from page 18, lines 14-15 and the center frequency of 5.25 GHz from page 17, line 20). That is, if you use different units, obviously you will not come out with an answer number times 10^6 because the decimal will be in a different location.

Additionally, in claims 8-13, the units of the inductance "Li" must be provided, and it appears that the units should be -- nH -- (see the spec. page 20, lines 15-28).

Appropriate correction is required.

Claim Rejections - 35 USC § 102

2. The following is a quotation of the appropriate paragraphs of 35 U.S.C. § 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

3. Claims 1, 2, 4 and 7 are rejected under 35 U.S.C. § 102(b) as being anticipated by Sato et al. JP 6-69750 (cited by Applicants).

Regarding claims 1, 4 and 7, Figs. 1, 2 and 7 of Sato et al. disclose a surface acoustic wave (SAW) filter comprising series arm resonators 21/23 (Figs. 1 / 2) and

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parallel arm resonators 11/13 connected with four-stages 30 (Fig. 1) in a ladder filter circuit structure, the SAW filter satisfying the expression:

$$1 \times 10^6 \leq 4\pi^2 f_0^2 R^2 \text{CopCos} \leq 3.1 \times 10^6 \text{ with } f_0 \text{ in GHz and Cop and Cos in pF}$$

when from Fig. 7, the ratio Cop/Cos is 0.5 so Cos and Cop must fall on that line in Fig. 7, and Cos and Cop must fall within the shaded area so, for example, Cop = 2.5 pF and Cos = 5.0 pF, and the impedance is disclosed as R = 50 Ohms (see e.g. sections [0041] and [0062]), and the center frequency is 932 MHz = 0.932 GHz, solving:

$$4\pi^2 R^2 = 4\pi^2 (50)(50) = 98696.04 \text{ and by substitution the equation becomes:}$$

$$98696.04(.932)(.932)(2.5)(5.0) = 1071621.8 = 1.07 \times 10^6 \text{ which is within the recited range of claim 1.}$$

Regarding claim 2, since in this instance the ratio Cop/Cos is not limited as it was by claim 4 in the example above, Sato et al. also discloses that for Cop/Cos = 0.25 in Fig. 7, the values of Cos = 8.0 pF and Cop = 2.0 pF fall within the desired shaded area, and solving yields: $98696.04(.932)(.932)(8.0)(2.0) = 1371675.9 = 1.37 \times 10^6$ which is within the recited range of claim 2.

Claim Rejections - 35 USC § 103

4. The following is a quotation of 35 U.S.C. § 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of

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the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

5. Claims 1, 8, 17 and 18 are rejected under 35 U.S.C. § 103(a) as being unpatentable over Satoh et al. U.S. 5,874,866 in view of Selmeier U.S. 6,747,530.

Figs. 9 and 10 of Satoh et al. disclose a SAW ladder filter with $Cos = 4.5$ pF and $Cop = 2.6$ pF and having a center frequency of 932 MHZ (see col. 8, line 6), which for a nominal impedance of 50 Ohms substitutes into the claimed equation as:

$98696.04(.932)(.932)(2.6)(4.5) = 1003038.0 = 1.003 \times 10^6$ which is within the recited range of claims 1 and 8.

Satoh also discloses the filter having four-stages (see Fig. 14) and discloses the filter being wire-bonded in a ceramic package (see Fig. 9 and col. 8, lines 9-11).

However, Satoh et al. does not explicitly disclose the impedance as 50 Ohms and does not explicitly disclose the inductance of the wire connecting the signal terminal being in the claimed range of 0.7 to 1.3 nH.

Selmeier discloses the notoriously well known standard impedance of 50 Ohms (see col. 4, line 44) and discloses that a typical inductance of bond wires (see Fig. 9 and Figs. 16 and 31) is 1.0 nH (see col. 10, lines 51-52) which is within the claimed range.

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to have modified the SAW filter of Satoh et al., if even

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necessary, such that the nominal impedance would have been 50 Ohms and the bond wires would have provided a 1.0 nH inductance, because both of these values would have been typical and standard in the art as evidenced by the suggestive teaching of Selmeier (col. 4, line 44 and col. 10, lines 51-52).

6. Claim 5 is rejected under 35 U.S.C. § 103(a) as being unpatentable over Sato et al. JP 6-69750 (cited by Applicants) in view of Flowers et al. U.S. 6,246,148.

Sato et al. discloses the invention as discussed above, except for a dielectric film covering the resonators.

Flowers et al. discloses that it is known in the SAW ladder filter art to cover the resonators with a dielectric film of silicon dioxide or silicon nitride to protect them from the device from environmental influences and from breakage due to pyroelectric discharge (see col. 2, lines 19-29).

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to have modified the SAW ladder filter of Sato et al. by having covered the resonators with a dielectric film such as taught, for example, by Flowers et al. (ibid.), because such an obvious modification would have provided the advantageous benefits of protection from environmental factors and from breakage due to pyroelectric discharge as explicitly suggested by Flowers et al. (ibid.).

7. Claim 15 is rejected under 35 U.S.C. § 103(a) as being unpatentable over Satoh et al. U.S. 5,874,866 in view of Selmeier U.S. 6,747,530 as applied to claim 8 above, and further in view of Flowers et al. U.S. 6,246,148.

The Satoh et al./Selmeier combination discloses the invention as discussed above, except for a dielectric film covering the resonators.

As discussed in the immediately preceding rejection, Flowers et al. shows and suggests covering the resonators in a SAW ladder filter with such a dielectric film.

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to have modified the SAW ladder filter of the Satoh et al./Selmeier combination by having covered the resonators with a dielectric film as taught, for example, by Flowers et al., because such an obvious modification would have provided the benefits of protection from environmental factors and from breakage due to pyroelectric discharge as explicitly suggested by Flowers et al. (see col. 2, lines 19-29).

Allowable Subject Matter

8. Claims 3 and 9-13 are allowable over the prior art of record.

9. Claims 6, 14 and 16 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

10. It should be noted that although Selmeier discloses that a bond wire inductance value of 1.0 nH is typical, a combination rejection with Sato et al. JP 6-69750 was not made because Sato et al. explicitly disclosed its bond wires with an inductance value of "about 1.5 nH" (see e.g. section [0051] of the attached machine translation), and in this instance it appears that changing that value to 1.0 nH would have changed the results of Sato et al's experimental results (see subsequent section [0053] - [0065]). Regarding

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the claims 11-13 which use flip chip mounting and a microstrip on the package to provide the inductance, Selmeier teaches flip chip bonding as an alternative to wire-bonding, but discloses the flip chip technique providing very low inductances (see e.g. col. 13, lines 38-60) due to the elimination of the bond wire, and does not appear to contemplate providing a microstrip on the package to compensate such loss (ibid.).

Conclusion

11. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

Matsui et al. U.S. 5,719,536 discloses a SAW ladder filter (Fig. 8) and discloses a range for values of C_{os} and C_{op} (see Figs. 4-6) based on various piezoelectric substrates used, and discloses a method for designing the filter (Fig. 7).

Satoh et al. U.S. 5,631,612 discloses SAW ladder filters and discusses values for the ratio of C_{op}/C_{os} (Fig. 52) and for inductances in series with a signal line (Fig. 23).

12. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Barbara Summons whose telephone number is (571) 272-1771. The examiner can normally be reached on M-Th, M-Fr.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Bob Pascal can be reached on (571) 271-1769. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

bs
December 16, 2004
(1 attachment)



**BARBARA SUMMONS
PRIMARY EXAMINER**